



## MEMORANDUM

**Date:** January 20, 2016

**File:**

**To: Mark Zacharias,  
Assistant Deputy Minister  
Environmental Protection Division**

### **Hazeltine Creek and Quesnel River Water Quality for samples collected December 3 and December 10, 2015 compared to Drinking Water Guidelines**

As part of the Ministry of Environment's (MOE) monitoring program, with respect to compliance/audit and quality assurance/quality control purposes, water samples from Hazeltine Creek and Quesnel River were collected by MOE staff on December 3 and 10, 2015. The December 3rd samples were collected two days after Mount Polley Mining Corporation (MPMC) began discharging treated effluent into Hazeltine Creek under conditions set out in their short term water discharge permit. This sampling will allow the Ministry to re-affirm Mount Polley Mining Corporation (MPMC) sampling results, determine the state of the water quality in Hazeltine Creek and determine if permit limits are being adhered to. Sampling on December 10<sup>th</sup> was done in response to reports of green coloured water by Likely residents, as well as to gather additional information on Cedar Creek, an inlet to Quesnel Lake. For this memo the results were reviewed to determine potential impacts to drinking water. However it should be noted that Hazeltine Creek itself is not a source of drinking water, but it does flow into Quesnel Lake, which does supply water to residents downstream.

The parameters analysed include pH, conductivity, turbidity, total suspended solids, total dissolved solids, dissolved organic carbon, hardness, alkalinity, nutrients, general ions, total and dissolved metals. All samples collected were analyzed by ALS. Side by side samples were collected with MPMC for December 3, 2015, however results were not available at the time of this memo, and they will be shared in subsequent memos. It should be noted that prior to the sampling date, Hazeltine Creek water levels had been highly variable during the first two days of discharge as MPMC was adjusting to higher volumes of treatment in the VEOLIA plant and subsequent variable release volumes as the permitted discharge. On December 2, 2015 water levels in Hazeltine Creek had been a foot higher. On December 3, 2015 there was shelf ice at the stream edge, making sampling difficult. The weather was warm and snow melt was occurring on the sample day (overland runoff was also observed). The Polley Lake outlet weir was closed at the time of sampling.

December 10<sup>th</sup> samples were collected by MOE only. Review of temperature profiles showed that Quesnel Lake had recently reached full overturn in the West Arm just prior to observation of the colour change. For more information see MOE Observational Summary Series, December 17, 2015.

Water samples were collected on the dates provided, from the following sites (all samples were collected at just below the surface - 0.1m):

- Hazeltine Creek at Outlet of Polley Lake Weir (MPMC site HAC-10) on December 3, 2015
- Hazeltine Creek upstream of Discharge (MPMC site HAC-13) on December 3, 2015
- Discharge pipe from MPMC treatment system prior to Hazeltine Creek (MPMC site HAD-03) on December 3, 2015

- Hazeltine Creek Upstream of Gavin Road Bridge (MPMC site HAC-05A) on December 3, 2015
- Hazeltine Creek Upstream of Ditch Road Bridge (MPMC site HAC-08) on December 3, 2015
- Hazeltine Creek Sediment Pond #1 at Intake (MPMC site HAC-12) on December 3, 2015
- Quesnel River at Likely Townsite (public dock) on December 10, 2015
- Quesnel Lake at Cedar Park Dock on December 10, 2015
- Cedar Creek upstream of bridge on December 10, 2015

Hardness concentrations do not affect drinking water guidelines, therefore the results for December 3, 2015 are found in Table 1 DW, and the results for December 10, 2015 are in Table 2 DW. Upon review it is noted that for the discharge pipe sample results taken on December 3, 2015, total suspended solids (TSS) slightly exceeded the permit limit of 15mg/L as MPMC was commissioning the treatment plant in its initial days of full use. MPMC collected water samples at this site on the same day as MOE and their weekly report lists the TSS result as 13.9 mg/L which is below permit limits, showing how variable sample results can be, even when collected a few minutes apart. Subsequent samples by MPMC at this site show that all values are in compliance with the permit.

Review of the Hazeltine Creek results determined that some parameters (turbidity, total aluminum and total selenium), still exceeded the WQGs for the protection of drinking water (DW) as noted from previous sampling events. However, there were additional parameters which also exceeded the DW guidelines. These include sulphate and total dissolved solids. In general most drinking water exceedances occur downstream of the discharge (HAD-03) with the exception of turbidity which was slightly elevated at the Polley Lake weir site (HAC-10). The Hazeltine Creek site located upstream of the Ditch Road Bridge (HAC-08) had the highest concentrations of some parameters. This site is located downstream of the canyon. Elevated values have been noted at this site in past MOE sampling and reported in previous memos for September 2015 sampling dates. As noted above, overland snowmelt was occurring on this sampling date and the previous day, Hazeltine Creek water levels had been 1 foot higher and likely at the highest volume of water since the channel was constructed.

There were only a few exceedances observed for the December 10, 2015 sampling in Cedar Creek upstream of the bridge. These were for turbidity, total phosphorus, total aluminum and total iron, which were above the DW guideline. This is likely reflective of background conditions in the area as well as recent snow melt events due to warm air temperatures. Health Canada indicates there is no weight of evidence for adverse health effects of aluminum at levels above the guideline. In addition, the iron drinking water guideline is based on staining and taste, not direct health effects. While chemical parameters may not be of concern, residents should still follow Health Canada protocols for treating raw drinking water.

When the short term water discharge permit was issued it was noted that the treatment system would not remove sulphate, selenium and other dissolved metals. Its primary function was removal of turbidity, and as such Hazeltine Creek, currently being designated non-fish bearing, would act as a conduit for the effluent to its final discharge point in Quesnel Lake. In reviewing the data that is supplied by MPMC for Quesnel Lake around the outfall area, there are no exceedances of the DW guidelines.

MOE will be conducting further sampling in Hazeltine Creek and Quesnel Lake as weather and safety conditions allow, to ensure permit and receiving environment requirements are being met.

Sincerely,

Deborah Epps, MSc., RPBio.  
Section Head, Provincial Water Quality

Appendix 1 – Photos of Hazeltine Creek from December 3, 2015



Photo 1. Hazeltine Creek at Polley Lake Weir (HAC-10)



Photo 2. Hazeltine Creek upstream discharge (HAC-13)



Photo 3. Effluent from discharge pipe (HAD-03)



Photo 4. Discharge pipe to Hazeltine Creek



Photo 5. Hazeltine Creek u/s Gavin Road (HAC-05A)



Photo 6. Hazeltine Creek u/s Ditch Road Bridge (HAC-08)



Photo 7. Hazeltine Creek at Sediment Pond #1 outlet (HAC-12)